# Analysis of Influencing Factors of Track Static Geometric Deviation of Super-Long-Span HSR Bridge

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## Abstract

Aiming at deformation characteristics of super-span bridge and track in high-speed railway at the acceptance stage, the key factors to track static geometrics are identified, namely the route profile, surrounding temperature, construction deviation and ballast density deviation. According to the study results, the principles of track profile setting is proposed, and the integrated criteria of midpoint chords based on 60 m, 30 m and 10 m is recommended to determine the track target geometric profile. The optimized track adjustment scheme should meet two conditions, first condition is that the irregularity midpoint chord values should not exceed 6 mm/60 m, 3 mm/30 m and 1 mm/10 m, and second condition is that the adjustment range of ballast thickness should be within ( -20 mm~+100 mm).

**Keywords:** high speed railway; long-span bridge; deviation of track static geometrics; temperature-induced deformation; engineering deviation.

## 1 Introduction

In recent years multiple combined highway and railway bridges have been proposed and built in China, each with over 1 km main span and design speed of 250 km/h. For example, with a 1,092 m main span, the Husutong Yangtze River Bridge and the Wufengshan Yangtze River Bridge have already been put into operation, while the Changtai Yangtze River Bridge (with a main span of 1,176 m) and the Ma'anshan Yangtze River Bridge (with 2*1,120 m main spans) with the structures of cable-stayed bridge and steel truss girder have already been in construction. The preliminary designs of the Xihoumen Yangtze River Bridge (1,488 m in main span, separated steel box girder as stiffening girder) and the Jiangyin Yangtze River Bridge (1,780 m in main span, steel truss girder as stiffening girder) have been approved, and the cooperation system of cable-stayed structure and suspension structure is adopted in both designs.

With more significant deflective deformation and a rise in structural stress, the increase of bridge span also intensifies the track irregularity on bridge. Unlike common span bridges, long-span railway bridge stands out for its engineering scale, systematic complexity and large displacement. Upon static/dynamic acceptance stage and operation period, the structural deformation and

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